

THE
AGRICULTURAL MUSEUM.

OMNIS FERET OMNIA TELLUS. VIRG.

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LUCUBRATION ON SOILS No. 2.....

The second shelf in the alluvial region, which may be designated by the name of the *undulating or siliceous region*, § begins at the ridge which forms the upper boundary of the flat stoneless region, and extends to the line of tide water. At this boundary ridge, which divides the first and second shelf, the soil begins to be intermixed with a portion of fine gravel, increasing in size and quantity as you ascend with the rivers. The surface of this second shelf, though in a great measure level, is yet intersected with small streams and drains, which have washed gentle declivities and risings. These declivities as you approach the head of tide water, assume more and more the appearance of hills. It is evident on reflection and examination of this second shelf in the land, that it once was as level as the flat stoneless land, until the springs, streams, drains or gullies, have, in the course of time, washed deeper and deeper, and their banks, which at first were steep, by a like gradual process, have assumed the appearance of gentle declivities. These declivities and their risings give to this region an undulating surface. The kind of soil that here prevails, abounds in gravel from fine to very coarse or stony, more or less apparent on the surface, according to the complexion and quality, or situation of the land. There are portions of this tract sometimes to a considerable extent, where fine siliceous sand prevails.

In this region the calcareous substances that are found in masses, are generally mixed with clay or sand. The shell of which they are composed being nearly decayed, and many times altogether so, forming yellow, blue or

§ Siliceous earth is often found in a stony form, such as flint or quartz; and still more frequently in that of a very fine sand, such as that whereof glass is made. It does not effervesce, nor is it soluble in any of the common acids.

grey marl, according to the colour of the clay or sand which predominates, and according to the quantity of the shell, or richness of the marl.—Marl is to be found in almost every part of this region, from 20 to 40 feet below the surface. The kinds of wood which predominate in this region, in Maryland and Virginia, are oak of all kinds, cedar, and the inferior kinds of pine; chestnut, hickory and other trees, are also frequently found, but rarely if ever predominate. Wherever in this gravelly region the oak has been cut down, and the land has been cleared and cultivated, and then turned out as it is called, it will generally put up in cedar and the meaner kind of pine, which growth, according to the observation of old men, does not continue longer than half a century, when the oak resumes its place. This growth of resinous trees seems to be intended by nature, to render light lands, and new-formed lands, more adhesive and compact, at least we have reason to suppose so from their glutinous quality; and from their generally growing in light lands, their tap roots sink deeper into this uncoacted earth, than the roots of any other kind of tree, and enable it to draw up more nourishment, and of course to throw off more foliage, which communicate their glutinous qualities to the soil. It seems probable also that their tap roots, which penetrate to such an amazing depth, particularly of the pine, far beyond the reach of frost, may be one cause of their perpetual verdure. When these large and deep descending roots decay, they may also serve as conductors of water and air, to assist nature in the great work of composition and decomposition, among the strata of the yet crude materials that form the basis of this new made land: in the course of revolving ages, when their task is finished, their place is supplied by trees of a different kind, that are intended to answer other great and mysterious purposes.

The soil of this division is drier and warmer than that of the flat stoneless division, and of course vegetation is somewhat quicker, and grain arrives sooner to maturity. It does not, however, abound so much in natural

riches, because from its undulating surface it is not so well calculated to retain them. From this circumstance, also the siliceous particles abound more on the surface. The stones or gravel which form a large portion of this soil, increases in size the higher you ascend the rivers. The gravel of the lower dividing ridge of this second shelf, is very fine; ten miles higher up, it is perceptibly coarser. As you approach the head of tide water, stones of a considerable size are found.—These stones and gravel are formed, as I apprehend, partly from the fragments of rocks that are torn away by the torrents, and are broken, divided and subdivided, and rounded off as they are rolled along, crowded together in the bottoms of streams and rivers, until they arrive at the places in which they become fixed: the further they are carried, the more are they broken, and the more is their size diminished. The finer particles or dust, which is detached by this continual rubbing and washing, is carried to the ocean, where it serves to form the pebbles that are cast back by the waves upon the shores. Another part is formed by the affinities of the siliceous particles that compose so large a portion of this region. The more ancient the soil, the more time has there been for the operation of the great laws of composition, and the larger are the products. This increase in the size of the stones the higher you ascend the land, seems wisely intended by providence, to preserve the moisture of high lands which would be too much exhausted for the purposes of vegetation, by reason of its general unevenness and elevation, were it not for the retentive properties of its stones.

It also may be remarked of the marls which are found in this region, that the disposition to turn to lime-stone increases the higher you ascend, though they very rarely shew themselves on the surface, but may be occasionally observed in banks that have been worn by streams.

Before we proceed to the description of the next grand region, it may be useful to recapitulate the subdivisions of the alluvial region, to wit: The flat stoneless, and the undulating or siliceous.

Its uses are for manure, for feeding cattle, or for burning, (when dried), into kelp, a sort of bleaching stuff.

As manure, the *alga* is peculiarly favorable for gardens, having a tendency to destroy the grubs and insects, common to such grounds. An acre of shore property covered with stones, in bearing, will manure annually an acre of arable land, and will give a heavy crop, and more permanent fertility than the best stable manure. For feeding cattle, the plant is not so well approved, as it is not known to be used in this way, unless in seasons of scarcity; when it is given to neat cattle after slight boiling, being of an unctuous appearance, it might be supposed to be nourishing, but whether it be from the disrelish of the cattle, or the nature of the plant itself, it will not fatten them as well as the ordinary vegetable fodder. For kelp, its value is pre-eminent, being cut, and spread out in the Sun, it dries immediately, and is burned in pits, into a liquid lava, and when cool, is taken out in lumps, and in that state sold at factories, where bleaching is required.

The great extent of the flats and beaches along the coasts, and in the bays of the United States, affords abundant scope for the production of this useful plant, and in all such places where stones are already placed or could be easily obtained, it would form a rich addition to our indigenous stock, if it could be naturalized on this side the Atlantic.

The probability is, that the current of the Gulph, bearing off this coast, prevents the germinating principles of the *alga* from reaching our shores by any other mode than that which has been mentioned, the introduction of some of the stones with the roots adhering, to be placed in some suitable situation, under the care of some practical gentleman, from whom the public might expect to derive information of the result.

J. N. T.

Washington City, March 4th, 1811.

For the Agricultural Museum.

ON AGRICULTURAL SCHOOLS.

Of infinite importance are early impressions and early habits. Education, in a Republic, ought to be considered not only as highly conducive to the interest and happiness of its citizens, but, as the very foundation of its permanency. Great attention has been paid in this country to what is called a common English education—almost every one, male and female, is taught to read and write, and there are numerous Colleges and Academies, where those who have leisure and inclination, and can afford the expence, may make still farther advances in science, and that to any useful, and almost to any desirable degree. But many young men, or their parents for them, have mistaken their talent, and given the bent of their genius a wrong direction. The professions of Law and Physic have become overstocked, and thus afforded the occasion, or the pretext, for multitudes to waste their existence in lounging and dissipation, who might have made good practical farmers, had they been brought up to honest industry in the cultivation of the soil, and with a much less expensive education.

By many it is supposed, that Agriculture is the only profession which requires little skill or previous knowledge, but that a man becomes a farmer, as soon as he enters on the possession of a farm. Hence, without doubt, arises the miserable state of our Agriculture in general, and the many unsuccessful attempts by individuals who have failed from no other cause, than the want of sufficient knowledge and experience. Agricultural Schools are therefore proposed, as the most ready and effectual method of introducing skill, and stimulating to industry in this important occupation.

To those who have ever reflected on this subject, how delightful would it be, to behold a numerous train of idlers converted into so many useful citizens; and instead of contributing to the misery and final dissolution of society, to see them raising themselves and their

country to real greatness, by honorable and well directed industry.

To promote this important object, let at least, one Agricultural School be formed under the patronage of each State government. Let a farm of one or two thousand acres be procured, furnished with implements of husbandry and well stocked—and let there be two professors; one, an active and intelligent practical farmer,—the other well acquainted with botany, history, mathematics, philosophy, and whatever may be requisite to a complete English education. A youth, by entering an Institution of this kind, would greatly relieve his parent from the expence usually attending the common mode of education, and would have the best opportunity to attain to a competent knowledge of a profession the most honorable and useful in the world. By exercising himself at the plough, the spade and the hook, his body would become hardy, active and vigorous, his mind would receive that cultivation that would qualify him for becoming a useful and valuable member of society.

It is this kind of education that is calculated to render us independent, especially in the Southern States of the Union; where, unfortunately, too many of our young men are devoid of a proper taste for rural employments, and would think themselves degraded in being found on a farm of ordinary size, or in paying that attention to it, which is absolutely necessary to insure success. Thus it frequently happens, that if their land is rich, it soon becomes impoverished by neglect or mismanagement; if it is poor, they fail of a livelihood, not knowing how to improve it; and in either case they must leave their friends and the land of their nativity, and seek a refuge in some distant country. But that I may not trespass too long upon your useful pages, I will close these miscellaneous remarks, with expressing the hope that the subject of them will attract the attention of some more ready writer than

Your Friend,

A FARNER,

UPON THE CULTURE OF HEMP.

Translated from the Treatise of Mons. du Hamel du Monceau.

Hot climates are not well adapted to the raising of hemp. Temperate regions suit it best, and even in cold countries it grows to advantage, such as Canada, Riga,† &c. which produce it in great abundance, and of good quality. From this last place, France, England, and Holland, annually derive a great supply.

The soil should be soft, easy to till, rather light though fertile, well manured and cultivated. Dry lands are not good. In such the hemp does not come up well. It is always short, and the thread generally too ligneous, which renders it hard and elastic; great defects these even for the coarsest uses, as we shall see in the sequel. It nevertheless in rainy seasons succeeds better in dry than in moist grounds; but such seasons are rare, on which account it is commonly sown by the side of a rivulet, or a ditch filled with water, in order that the water may be at hand, but not so as to overflow it. Such lands are called in some provinces courtiers, or courtits, and are much sought after.

Every kind of manure which makes the soil light is suitable. On this account horse dung, the excrement of sheep and pigeons, the sweepings of the poultry yard, the manure taken from stagnant pools, when ripened by age, are preferable to the dung of the ox or cow. Whether marle is used or not I am not able to say.

The right course is to manure the hemp fields annually before the winter tillage, that the manure during the winter may have time to rot, and that it may more easily mix with the soil when tilled in the spring. The pigeon dung is the only one they spread at the spring or last tillage, and this they do to avail themselves of its whole strength. However, when the season is dry there is danger of burning the seed, which does not happen

† It is the Ukraine which produces the Hemp, and Riga is only the port from which it is exported.

when it is spread in winter. In this case a greater quantity is necessary to produce a good crop.

The first and most important tillage is performed in December or January, which is called mid-winter tillage. Some do it with the plough, making furrows, others with the hoe, also making furrows, that the winter frosts may more easily penetrate the soil; some also perform this work with the shovel or spade, which is doubtless the best mode—but this requires more time and labour, whereas the use of the plough is the most expeditious and least profitable.

In the course of April the seed is put into the ground. Some sow a fortnight sooner than others, and all take different risques. The most early are exposed to the frosts, which do great injury to the young shoots, while those who sow too late run the hazard of droughts, which sometimes prevent the hemp from coming up.

The seed should be sown thick, otherwise the stalks will be large, the bark will be too ligneous, and the threads too harsh, which is a great fault; yet when it is sown too thick, many of the roots are choaked, and this is an injury. A medium should be adopted, which habit will point out, and generally the stalks are not too sparse but when a part has been destroyed either by frost, by drought, or other accidents.

It is proper to remark, that the hemp is an oily seed, which grows rancid by age, and then it will not vegetate; wherefore the seed of the preceding year should alone be put into the ground. When seed two years old is sown, a great part will not come up; and if older, still more will perish.

When the hemp is sown, it should be covered with earth. This is done either with a harrow, if the land has been prepared with a plough, or with a rake if prepared with a hoe or spade.

Notwithstanding this precaution, the hemp must be carefully guarded until completely come up; otherwise, a variety of the feathered tribe, pigeons especially, will destroy the whole, even the seeds that are best covered.

It is true that pigeons, and those birds that do not scratch, do no damage to grain when covered with earth; but the difference between the two kinds of seeds is, that grain does not force itself out of the ground with the shoot it produces, whereas hemp seed forces itself out when it vegetates. Then it is that the pigeons make great havock, and upon sight of the seed, tear the plant and make it wither.

The peasants endeavour to fright away the birds by scare-crows; they also set their children to protect the hemp. But these precautions are not fully adequate; for the task is difficult when the fields are extensive, and hunger stimulates the pigeons. Indeed I have seen strong persons and even dogs, from excess of fatigue, abandon their charge. Fortunately this care is not required any length of time. There is an end of it when the foliage has multiplied.

The fields, which until the springing up of the hemp, require much care and labor, demand but little more until harvest. It suffices to maintain the surrounding ditches in order, and to keep off the cattle. Yet in great droughts there are some industrious people who water their fields, provided they are of small extent, and the water is at hand, and that they cannot be overflowed, which is, I believe, practised in some parts.

I have already said that accidents sometimes happen to make the hemp field thin, and it has been observed that the hemp is then thick, full of branches, and incapable of yielding a good thread. In this case, to derive something from the field, if seed only, which form the coarseness of the hemp will be of better quality, the field should be weeded to prevent the weeds from choking the hemp.

Towards the beginning of August, the stalks which do not bear seed, and which are improperly called female hemp, but which I call male, begin to turn yellow at the top, and white at the bottom, which indicates them fit to be pulled. At this time, women enter the field and pull up all the male stalks, of which they make

bundles and arrange them on the borders of the field, taking care not to injure the female stalk, which must remain unpulled sometime longer, to bring to maturity its seed.

Before the male hemp is gathered, some persons sow turnip seed, which buries itself in the holes from which the stalks were extracted, and in those made by the footsteps of persons employed therein. Turnip seed is also sown when the female stalks are gathered, in order to have two crops; but this part of husbandry, not belonging to our subject, we dismiss it.

It has been already observed, that the male hemp was bundled up after being gathered. In doing this, they put stalks of a like length together and place the roots even. Each bundle is tied with a hemp stalk.

They are then exposed to the sun to dry the leaves and flowers, and when well dried, each bundle is beaten against the trunk of a tree or against a wall, and they then attach together several bundles, and make one sufficiently large to carry to the Routoir.

The place called the Routoir, in which the process of rotting is performed, is a ditch of from eighteen to twenty-four feet long, from twelve to eighteen feet broad, and from three to four feet deep, filled with water. This is often supplied by a spring, which after filling, the routoir is let off through a channel prepared for it. Some routoirs are only a ditch made on the border of a river; some, even in contempt of the laws, use no other routoirs than the bed of a river. In fact, when there is no spring nor river at hand, they deposit the hemp in the ditches that are filled with water, and in the meadows. Let us now take a view of the end they propose by this method of rotting. To do it they arrange it at the bottom of the water, they cover it with a layer of straw, they secure it under water by pieces of wood and stone. It thus remains until the bark, from which the thread proceeds, is detached with ease from the stalks. This is ascertained by trying from time to time whether the adherency of the bark to the stalk still continues. When it is sever-

ed with ease, the hemp is thought to be sufficiently rotted, and is then taken from the rutoir. This operation effects more than the detaching of the bark from the pulp. It renders the filament soft and fine; but to understand how this result is produced by water, a knowledge of the organic disposition of the stalk is necessary. This I will attempt to explain, with as much brevity as I am able.

The stalks are hollow in the middle, or filled with a soft pulp. This is surrounded with a tender and fragile wooden substance, which is called the *chenevotte* or stalk stripped of its bark. Over the *chenevotte* is a bark, rather fine than otherwise, composed of filaments which extend the whole length of the stalk. This bark adheres closely to the *chenevotte* and the longitudinal fibres which compose it are joined to each other by a vesicular or cellular texture. The whole is finally covered with a very fine membrane, which may be called the *epiderme*. The object proposed in immersing the hemp, is to cause the bark to detach itself with more ease from the stalk, and to destroy the *epiderme* with a part of the cellular texture, which binds together the longitudinal filaments. All this is brought about by putrescence, for which reason it is hazardous to keep the hemp too long immersed, for then it rots too much; in other words, it acts not only upon the outer skin and the finer fibres, but it acts with too much force on the longitudinal fibres; in fact it rots the hemp too much, and in that case the thread loses its strength. On the other hand, when the hemp has not been long enough in the water, the bark continues to adhere to the stalk, the thread is hard, elastic, and cannot be made fine enough. There is therefore a medium to be observed, and this depends not alone upon the extent of the time of the immersion of the hemp, but also—Firstly, upon the quality of the water; which when still, rots the hemp sooner than running water; so does foul sooner than limpid. Secondly, upon the temperature of the air; as it rots sooner in warm than cold weather. Thirdly—upon the

quality of the hemp. That which has been raised in a free soil, and duly watered, and which has been gathered green, is sooner rotted than that which is raised in strong or dry soil, and which has been suffered thoroughly to ripen. In general, it is thought that when the hemp remains but a short time in the water to rot, the thread is better. On this account it is said, that hemp should not be rotted but in warm weather. And when the autumns are cold, some defer until the spring following to put the female hemp in water. Some even prefer to rot their hemp in stagnant and even in putrid, rather than in fresh running water. I have put it into different waters to rot, and it has appeared to me that the thread of the hemp rotted in putrescent water was softer than that rotted in running water; but the filament contracts in stagnant water a disagreeable colour, which in truth does not damage it, for it bleaches thereby more easily; yet this colour is disgusting, and on that account the filament is not so merchantable. For this reason, when it can be done, they turn a little stream into the routoirs to renew the water and prevent it from becoming putrescent.

I have made out to rot the hemp by spreading it over a meadow as they do linen to whiten it; but this is a tedious mode. The thread, however, has appeared to me not very different from that rotted in the usual mode. I have further attempted to boil the hemp in water, hoping in a short time to bring it to the same state as when taken out of the routoir; but after having boiled it more than ten hours, on taking it from the water to dry, it was not in a condition to be thoroughly separated, or fit for the brake. It is true that when it was broke warm and wet, the bark was detached with ease, but it remained like a ribband. The cellular texture not being removed, the longitudinal fibres cohered. They could not be separated; and it was impossible to make the hemp sufficiently fine. From this it is evident, as we have before observed, that it is next to impossible precisely to define the length of time that hemp should remain in the rou-

toir ; since the quality of the hemp, that of the water, and the temperature of the air impede or advance its progress in this operation.

The usual criterion that the hemp has been sufficiently rotted, is, when the bark is easily detached from its stalk from top to bottom. It must also be allowed that the habitual employment of the peasants who cultivate it, must aid them much in deciding upon the requisite degree of rot. They however are sometimes mistaken ; and I have observed that in some provinces they are in the habit of rotting it more than in others.

I must not omit to caution against rotting the hemp in water in which the fresh water shrimps abound ; for these animals eat and almost destroy the thread.

When upon the subject of gathering the male hemp, we remarked that the female was left standing to gain time to ripen its seed. This however causes the hemp itself to become too ripe. Its bark becomes too ligneous, and of consequence its threads thicker and coarser than that of the male. Notwithstanding this, when the seed appears to be well formed, the female hemp is gathered in the same manner with the male, and arranged in sheaves.

In some places, to complete the ripening of the seed, they dig in the hemp field round holes of a foot depth, and from three to four feet diameter. In these they put a number of sheaves well bound together, with the heads of the sheaves in the holes and the roots above. They are fastened in this situation with cords of straw, and the earth which has been taken from the holes is heaped up round the bundle of sheaves so as to cover their heads. Aided by their own moisture, the heads become heated as green hay does placed upon a layer of manure. This fermentation completes the ripening of the seed, and disposes it to leave its shell with more ease. When the seed has acquired this quality, the sheaves are taken from the holes, where they would be consumed were they longer to remain. In other cantons where much hemp is raised, they do not bury the heads in this way, but stack the

sheaves placing their heads together, and extract the seed in the manner I shall presently show.

Those who raise but small quantities, spread cloth upon the ground to catch their seed. Others clean and prepare a smooth piece of ground, upon which they place the hemp with the heads all on the same side. They then beat it lightly with a piece of wood or flail. This brings out the best seed, which is put by for sowing the next spring. There still remains much seed in the heads. To extract it, they pass the heads through a comb with iron teeth. This takes off at once the leaves, the teguments of the seeds, and the seeds themselves. The whole is kept in a heap several days, then spread for drying, then beaten or threshed, and winnowed to separate the seed; with this they feed birds and make hemp-seed oil. The sheaves are carried to the routoir, to pass through the same operation with the male sheaves.

When the sheaves are taken from the routoir, they are opened for drying, and spread towards the sun by the side of a wall, the borders of a ditch, or on open ground if it is not moist. They take care frequently to turn the hemp, and when well dried it is again put into sheaves to be placed under cover, where it is kept dry until they are ready to break it with the hand or a brake. In some provinces it is wholly broken and separated by the hand, and in others those only who raise small quantities, break it with the hand; the rest use the brake.

The manner of doing it with the hand is so simple that children can perform it as well as grown persons. It consists in taking the threads separately, breaking the stalk, and detaching the threads by pulling them through the fingers. This mode appears rather tedious, but as it is pursued at leisure hours, and by children who take care of the cattle, it is but of little expense to many families; but to small families it occasions great loss of time which the use of the brake would save.

Before it is broken, hemp ought to be well dried, or, as the peasants say, well baked. For this purpose, they have at some distance from their houses a haloir or dry,

ing kiln. Some peasants dry the hemp in the chimneys of their dwelling houses ; but this is a very dangerous practice. Some place it in their ovens to dry ; these do not indeed expose their houses, but their hemp often takes fire ; besides, in this mode a large quantity cannot be dried. The haloir is only a cavern commonly of six or seven feet high, five or six broad, and nine or ten deep. The underside of a rock frequently makes a very good haloir. Some are arched with dry stones ; others are covered with large flat stones ; others merely with pieces of wood covered with earth. Every man makes them according to his fancy ; but all aim to place them secure from the north wind, and to give them a southern aspect. Because the breaking season is generally when the great frosts prevail, and when agriculture is at a stand.

About four feet above the fire place of the haloir, and two feet from its mouth, three wooden bars are fixed of about an inch diameter ; they cross the haloir from one wall to the other, and are thereby supported by the walls. Upon these wooden bars the hemp is placed of the depth of six inches to be dried. Thus arranged, a careful woman keeps up, underneath, a fire made of the useless part of the stalks ; care is requisite, because the stalks, which are the common fuel for the purpose, consume rapidly, and require to be constantly supplied to support the fire in every part of the cavern ; and equal care is necessary to prevent the flame from rising and communicating with the hemp, which is very combustible, especially after it has been some time in the haloir. The same woman must turn the hemp over, to dry it equally on all sides. She must also place fresh hemp when that which is well dried is taken away to be broken.

[To be concluded in our next.]

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